during the past months. Participants were excluded if they (i) exhibited concomitant pain from other knee structures; (ii) described current or previous physiotherapy for knee pain (prior 12 months); and (iii) knee or hip arthroplasty or osteotomy.
Radiographic severity of TFJ OA was assessed from a semiflexed, posteroanterior weight-bearing short film radiograph with the feet externally rotated by 10°. Radiographic severity of PFJ OA was assessed from weight-bearing skyline radiographs, with the knee positioned at 30-40°knee flexion. Severity of radiographic OA was assessed by the same two examiners (KMC, RSH) from digital radiographic images, with meetings to discuss discrepant findings and obtain consensus when required. The Kellgren and Lawrence (K/L) score was assigned in a manner previously described in the literature, to both the TFJ and to the PFJ. Furthermore, separate gradings were conducted on the medial and lateral components of the PFJ. Inter-rater reliability (κ) for grading TFJ and PFJ radiographic OA on a subset of 39 participants ranged from 0.745-0.843.
Results: 224 individuals with chronic AKP (115 (51%) women, mean±SD: age 54±10 yrs, height: 1.69±0.10 m; weight 79±15 kg; body mass index (BMI) 27±4 $kg.m^{-2}$) were recruited into this study. 67 (30%) had no radiographic OA, 57 (25%) had isolated PFJ OA, 2 (9%) had isolated TFJ OA and 98 (44%) had combined PFJ and TFJ OA. Within the TFJ, 123 (55%) had no TFJ OA, 56 (25%) had mild TFJOA and 45 (20%) had moderate/severe TFJ OA. For the lateral PFJ, 91 (41%) had no PFJ OA, 83 (37%) had mild PFJ OA and 50 (22%) had moderate/severe PFJ OA, while for the medial PFJ, 103 (46%) had no OA, 76 (34%) had mild PFJ OA and 45 (20%) had moderate/severe PFJ OA.
In those 80 participants (36% of cohort) who were aged between 40 and 50 yrs (38 (48% women, age 45±3 yrs; height 1.70±0.10 m, weight 79±17 kg, BMI 27±5 $kg.m^{-2}$), 36 (45%) had no radiographic OA, 21 (37%) had isolated PFJ OA, 1 (1%) had isolated TFJ OA and 22 (28%) had combined PFJ and TFJ OA.
Conclusions: The majority (70%) of people presenting to this trial with chronic AKP had radiographic signs of OA. The prevalence of PFJ OA (67%) was greater than the prevalence of TFJ OA (51%), and the medial and lateral PFJ appeared to be affected similarly. The prevalence of radiographic OA was still considerable (55%) in individuals aged 40-50 years, with high rates of PFJ OA (54%). PFJ OA appears to be an important problem in individuals with chronic AKP and future studies need to investigate the link between AKP in individuals less than 40 years and the development of PFJ OA.

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IMMEDIATE EFFECTS OF UNLOADER KNEE BRACE ON KNEE PAIN AND CONFIDENCE IN INDIVIDUALS WITH OSTEOARTHRITIS AFTER ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION

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Purpose: Anterior cruciate ligament reconstruction (ACLR) is a well recognized risk factor for post-traumatic knee osteoarthritis (OA). Post-traumatic knee OA can have a substantial impact on quality of life (QOL), general and mental health, and participation in exercise and work-related activities, particularly in younger individuals. Thus, targeted conservative interventions with the potential to reduce pain and improve QOL are urgently required. This study aimed to evaluate the immediate effects of the unloader knee brace on (i) pain; and (ii) confidence in the knee during functional tasks, in individuals who have developed post-traumatic knee OA 5-12 years post-ACLR.
Methods: Twenty-eight participants who had undergone ACLR between 5-12 years prior, were aged ≥ 18yrs at the time of surgery, and had current symptomatic and radiographic tibiofemoral and/or patellofemoral OA (Kellgren and Lawrence ≥1) were recruited for this within-subject randomized clinical study from medical and health practitioner referrals, our existing database and advertisements. To determine the severity of OA symptoms and to characterize the cohort, the Knee Injury and Osteoarthritis Outcome Score (KOOS) was obtained at the beginning of the session. Knee pain and confidence were assessed during a battery of four functional tasks including single-leg hop for distance, side to side hop, single leg rise and the step down test (5 repetitions of stepping down from a step to tap their control leg to the floor). After baseline assessment, knee pain and confidence were assessed via visual analogue scales, in a blinded manner under two testing conditions: (i) adjusted brace (anterior-posterior stability and varus/valgus adjustment); (ii) unadjusted brace (anterior-posterior stability, no varus/valgus adjustment). The order of conditions was randomized via concealed allocation and applied by a second investigator. Data were analyzed with non-parametric tests and $p<0.05$ was considered statistically significant.
Results: Twenty-eight participants (13 male, 15 female), age (mean±SD) 45±11.6yrs, height 1.72±0.08m, body weight 78±15 kg, were tested. The KOOS-symptoms was 62±29, KOOS-pain was 59±37, KOOS-ADL (activities of daily living) was 59±42, KOOS-sport and recreation was 61±29 and KOOS-knee related QOL was 59±26. There was a significant bracing effect, with reduced pain during the step down test ($p=0.035$) and greater confidence during the single leg hop for distance ($p=0.004$), side to side hop ($p=0.003$) and single leg rise ($p=0.006$) in the braced conditions. There were no differences observed between the adjusted and unadjusted brace conditions except for confidence during the single leg rise, where greater confidence was observed when wearing the adjusted brace than the unadjusted brace ($p=0.025$).
Conclusions: In younger individuals with post-traumatic knee OA following ACLR, the unloader knee brace resulted in greater knee confidence in single leg hop, side to side hop and single leg rise tasks, and reduced pain in the step down task. Confidence with the single leg rise, was the only measure to improve with the varus/valgus adjustment
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ABNORMAL UP-REGULATION OF β-CATENIN SIGNALING LEADS TO SEVERE DEFECTS IN INTERVERTEBRAL DISC TISSUE

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Purpose: The incidence of low back pain is extremely high and is often linked to the intervertebral disc (IVD) degeneration. The mechanism of this disease is currently unknown. In this study, we have investigated the role of β-catenin signaling in IVD tissue function.
Methods: β-catenin protein levels were measured in disc samples derived from patients with disc degeneration and normal subjects by IHC. To generate β-catenin conditional activation (cAct) mice, *Col2a1-CreER^{T2}* transgenic mice were bred with *β-catenin$^{fx(Ex3)/fx(Ex3)}$* mice. Changes in disc tissue morphology and function were analyzed by micro-CT, histology and real-time PCR assays.
Results: We found that β-catenin protein was up-regulated in disc tissues from patients with disc degeneration. To assess the effects of increased β-catenin on disc tissue we generated *β-catenin* cAct mice. Overexpression of β-catenin in disc cells led to extensive osteophyte formation in 3- and 6-month-old *β-catenin* cAct mice which were associated with significant changes in the cells and extracellular matrix of disc tissues and growth plate. Gene expression analysis demonstrated that activation of β-catenin could induce Runx2-dependent *Mmp13* and *Adamts5* up-regulation. Moreover, genetic ablation of the *Mmp13* or *Adamts5* under *β-catenin* cAct background, or treatment of *β-catenin* cAct mice with a specific MMP13 inhibitor, ameliorated the mutant phenotype.
Conclusions: β-catenin signaling pathway plays a critical role in disc tissue function. These findings provide significant insights into the regulatory mechanism of disc function and establish a potential molecular target for the treatment of degenerative disc disease.

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CELL LINES FOR THE HUMAN INTERVERTEBRAL DISC: NUCLEUS PULPOSUS AND ANNULUS FIBROSIS

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